

## ABSTRACT OF THE DISCLOSURE

An apparatus and a method for controlling an operation of a reciprocating compressor can improve efficiency of a compressor by reconciling an operation frequency with a mechanical resonant frequency. The apparatus includes a  
5 mechanical resonant frequency calculating unit for calculating mechanical resonant frequency, using a current applied to a compressor and a stroke; an operation frequency reference value determining unit for determining an operation frequency reference value within a predetermined range of the calculated mechanical resonant frequency; and a controller for comparing the determined  
10 operation frequency and a current operation frequency, and then variably controlling an operation frequency of the compressor according to the comparison result, so that stroke feedback or TDC feedback can be controlled more accurately. Accordingly, an operational efficiency of the compressor is improved.